



10102-1

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of : A. W. Chester et al.  
Serial No. : 09/221,540  
Filed : 28 December 1998  
For : Gasoline Sulfur Reduction in Catalytic Cracking  
Group Art Unit : 1764  
Examiner : -

PATENT

Information Disclosure Statement

Assistant Commissioner for Patents  
Washington, D.C. 20231

Fairfax, Virginia 22037

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Sir,

The attached Form PTO 1449 identifies references which are relevant to the examination of this application.

The Yoo patents, U.S. 4,963,520; 4,957,892; 4,957,718; 4,790,982 describe the use of magnesium-aluminum spinels as additives to the circulating catalyst inventory in the FCCU. Again, however, sulfur levels in the liquid cracking product are not greatly reduced.

The Wormsbecher and Kim patents, U.S. Patents 5,376,608 and 5,525,210, describe the use of a cracking catalyst additive of an alumina-supported Lewis acid for the production of reduced-sulfur gasoline.

U.S. 4,976,847 (Maxwell) discloses the use of an FCC catalyst combination of a cracking component such as zeolite Y and a relatively smaller pore zeolite such as ZSM-5 which contains a metal dehydrogenation component such as zinc or gallium. The objective of using

this additive is to increase olefin production and there is no suggestion in the patent that any desulfurization is achieved.

EP 461 851 (Aray/Crosfield) describes a zeolite composition which comprises a matrixed zeolite Y containing metal ions including zinc or copper, this catalyst being used as an additive in hydrocarbon cracking, especially FCC, for enhanced activity, increased aromatization and metals (V, Ni) passivation. There is no suggestion that sulfur reduction might be achieved.

CA 1,117,511 (Albers/Grace) describes a catalyst composition which comprises a rare earth exchanged zeolite such as zeolite Y which is bound with an inorganic oxide sol and which also contains a specified quantity of platinum or palladium. The catalyst is stated to be useful for control of carbon monoxide and sulfur oxides from FCC regenerator stack gases; there is no suggestion that sulfur levels in the liquid cracking products might be reduced with this material.

Krishna et al, *Additives Improve FCC Process*, Hydrocarbon Processing, November 1991, pages 59-66, describes the use of alumina compounds as additives to the inventory of cracking catalyst to adsorb sulfur oxides in the FCC regenerator; the adsorbed sulfur compounds which enter the process in the feed are released as hydrogen sulfide during the cracking portion of the cycle and passed to the product recovery section of the unit where they were removed. The sulfur is removed from the stack gases from the regenerator but product sulfur levels are not greatly affected, if at all.

*Fluid Catalytic Cracking with Zeolite Catalysts*, Venuto et al., Marcel Dekker, New York, 1979, ISBN 0-8247-6870-1, page refers to the established practice of using zeolitic cracking catalysts with a low sodium content for optimum cracking activity and with rare earth elements such as cerium and lanthanum for greater hydrothermal stability.

Application Serial No. 09/144,607, filed 31 August 1998 describes catalytic materials for use in the catalytic cracking process which are capable of reducing the sulfur content of the liquid

products of the cracking process. These sulfur reduction catalysts comprise, in addition to a porous molecular sieve component such as a zeolite, for example, zeolite Y or ZSM-5, together with a metal in an oxidation state above zero within the interior of the pore structure of the sieve. Metals such as vanadium, zinc, iron, cobalt, and gallium are stated to be effective for the reduction of sulfur in the gasoline, with vanadium being the preferred metal.

Application Serial No. 09/221,539, filed concurrently (Mobil IP Case No. 10101-1) describes catalyst compositions for the reduction of sulfur in gasolines based on large pore zeolites, especially zeolite USY which contain vanadium and rare earth cations.

The citation of prior applications in this statement is not a waiver of the right of secrecy under 35 USC 122 and 37 CFR 1.14 for those applications.

Respectfully submitted,



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January 19, 1999